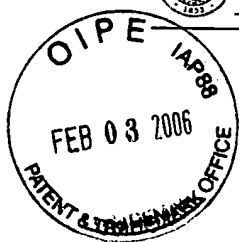




UNIVERSITY OF
FLORIDA

IFAS



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14625 County Road 672
Wimauma, FL 33598
(813) 633-4136/SC514-6826
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November 22, 2005

Kent L. Bell
Primary Examiner
U.S. Patent and Trademark Office
Alexandria, Virginia

Dear Mr. Bell:

In reference to plant patent Application No. 10/613,317, I declare that Silvia Rondon, Ashwin Paranjpe, and Daniel Cantliffe were colleagues of mine at the University of Florida at the time they were evaluating various strawberry cultivars and selections for adaptability to protected culture, including susceptibility to powdery mildew and several arthropod pests. In fact, I provided them with plants of FL 95-256 ('Carmine') for use in their trials because I was particularly interested in how this promising selection would perform in a hydroponic greenhouse system. 'Carmine' was not sold more than one year prior to the filing of the patent application.

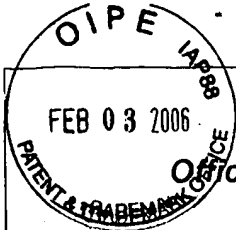
Sincerely,

Craig K. Chandler
Professor



Approved for use through 07/31/2006. OMB 0561-0031
Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.



Office Action Summary

Application No. 10/613,317	Applicant(s) CHANDLER, CRAIG K.
Examiner Kent L. Bell	Art Unit 1661

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on papers filed 6/28/04.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 7/7/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

K Bell

Detailed Action

Claim Rejection – 35 USC 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejection under this section made in this Office action:

A person shall be entitled to a patent unless --

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or foreign country, before the invention thereof by the applicant for patent.

Claim 1 is rejected under 35 U.S.C. 102(a) based upon the instant invention (cultivar) being known and used in this country.

The journal article by Rondon et al. (Strawberry cultivars grown under protected structure and their susceptibility to natural infestation of the cotton aphid, *Aphis gossypii* glover; Abstract only) describes 'Carmine' as being known to others; Silvia Rondon, Ashwin Paranjpe, and Daniel Cantliffe, whom are different than the instant inventor. The journal article also describes 'Carmine' being used in evaluating the susceptibility of different strawberry plants following the exposure to the cotton aphid while grown in a greenhouse.

The 102(a) rejection can be overcome by applicant filing a "Katz" type declaration explaining that the persons set forth above were known by the inventor and why the instant invention was not known in this country prior to the filing of the instant application. The declaration can also explain why the instant invention was not in public use, possibly explaining

Detailed Action

that the persons, Silvia Rondon, Ashwin Paranjpe, and Daniel Cantliffe, had a testing agreement with the instant inventor and that the instant plant was not sold more than one year prior to the filing of the instant application.

Objection to the Disclosure

37 CFR 1.163

The following is a quotation of section (a) of 37 CFR 1.163:

(a) The specification must contain as full and complete a disclosure as possible of the plant and the characteristics thereof that distinguish the same over related known varieties, and its antecedents, and must particularly point out where and in what manner the variety of plant has been asexually reproduced. In the case of a newly found plant, the specification must particularly point out the location and character of the area where the plant was discovered.

35 USC 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Detailed Action

As specific to United States Plant Patent applications, the specifics of 37 CFR 1.164 (reproduced below) are controlling:

The claim shall be in formal terms to the new and distinct variety of the specified plant as described and illustrated, and may also recite the principal distinguishing characteristics. More than one claim is not permitted.

In plant applications filed under 35 U.S.C. 161, the requirements of 35 U.S.C. 112 are limited. The following is a quotation of 35 U.S.C. 162:

No plant patent shall be declared invalid for noncompliance with section 112 of this title if the description is as complete as is reasonably possible. The claim in the specification shall be in formal terms to the plant shown and described.

The disclosure is objected to under 35 CFR 1.163(a) and under 35 U.S.C. 112, first paragraph, because the specification presents less than a full, clear, and complete botanical description of the plant and the characteristics which define same per se and which distinguish the plant from related known cultivars and antecedents.

More Specifically:

A. Page 1, line 3, Applicant should set forth in the specification the cultivar designation such as --Cultivar designation: 'Carmine'--.

Detailed Action

B. Page 2, line 6, Applicant states "from all other strawberry plants". Rather than stating the recitation above it is suggested that Applicant insert --from all other strawberry plants known to the inventor-- as it is in the realm of possibility that another strawberry variety with the same or similar characteristics exists unknown to the inventor.

C. Page 2, lines 10 and 11, Applicant should set forth in the specification a brief description for each photographic drawing in the application.

D. Page 2, line 15, Applicant states "www.pantone.com". The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code. Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01.

E. Applicant should set forth in the specification additional information relative to the instant plant's leaflets including the typical and observed leaflet shape and apex and base descriptors.

Detailed Action

F. Applicant should set forth in the specification additional information relative to the instant plant's petals including the typical and observed petal shape and apex, margin, and base descriptors.

G. Applicant should set forth in the specification additional information relative to the instant plant's corolla including the typical and observed corolla depth.

H. Applicant should set forth in the specification information relative to the instant plant's sepals including the typical and observed sepal number, shape, length, width, and apex and margin descriptors.

I. Applicant should set forth in the specification additional information relative to the instant plant's pedicles including the typical and observed pedicel diameter and coloration with reference to the employed color chart.

J. Page 3, line 22, Applicant states “(www.nass.usda.gov/fl.com)”. The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code. Applicant is required to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01.

KZB
7/25/65

613,217
Serial Number: 10/624,710
Art Unit: 1661

Page 7

Detailed Action

K. Page 5, Table 1, page 6, Table 2, page 7, Table 3, and page 8, Table 4, Applicant sets forth letters, "a", "b", "c", "ab", "abc", and "bc", but do not set forth what the letters represent. Applicant should set forth in the specification what the letters represent. Correction and/or clarification is necessary.

The above listing may not be complete. Applicants should carefully review the disclosure and import into same any corrected or additional information which would aid in botanically identifying and/or distinguishing the cultivar for which United States Plant Patent protection is sought.

Claim Rejection

35 U.S.C. 112, 1st & 2nd Paragraphs

Claim 1 is rejected under 35 U.S.C. 112, first and second paragraphs as not being supported by a clear and complete botanical description of the plant for the reasons set forth in the Objection to the Disclosure Section above.

12/8/15
7/24
Serial Number: 10/624,710
Art Unit: 1661

Page 8

Detailed Action

Potential 102

Applicant is required to provide the necessary information set forth in the attached Requirement for Information under 37 CFR 1.105 as it appears the plant may have been sold at least one year prior to the filing of the instant application.

Future Correspondence

Any inquiry concerning this communication or earlier communications from the Examiner should be directed to Kent L. Bell whose telephone number is (571) 272-0973. The Examiner can normally be reached Monday through Thursday from 6:00 am to 4:30 pm.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Andrew Wang, can be reached at (571) 272-0811.

The fax phone number for the group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone number is (571) 272-1600.

K. L. Bell

**KENT BELL
PRIMARY EXAMINER**

Kent L. Bell

Detailed Action

REQUIREMENT FOR INFORMATION UNDER 37 CFR 1.105

Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application. The information is required to determine the accessibility of the foreign sales and the reproducibility of the plants that were sold to the public, more than one year prior to the effective filing date of this application.

The information is required to determine when, and to what extent, the claimed plant variety 'Carmine', was publicly available prior to the filing date of the instant application.

In response to this requirement, please provide (to the extent not already provided):

- a) a copy of any plant breeder's rights applications, published proposed denominations, and breeder's rights grants, relating to the claimed plant variety;
- b) a copy of any publications or advertisements relating to sales, offers for sale, or public distributions of the claimed variety anywhere in the world if the sale, offer for sale, or public distribution occurred at least one year prior to the filing date of this application;
- c) any public information available regarding sales, offers for sale, or public distributions of the claimed plant variety anywhere in the world which occurred at least one year prior to the filing date of this application, including the date(s) and location(s)

The Office does not maintain a collection of Breeders' Rights documents and they are not readily obtainable electronically. It is reasonable to expect that Applicant or the assignee can

Serial Number: 10/624,710
Art Unit: 1661

Page 10

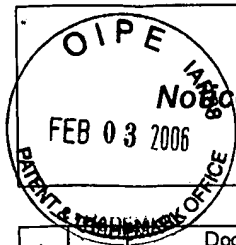
Detailed Action

readily obtain the requested documents and information.

The fee and certification requirements of 37 CFR 1.97 are waived for those documents submitted in reply to this requirement. This waiver extends only to those documents within the scope of this requirement under 37 CFR 1.105 that are included in the applicant's first complete communication responding to this requirement. Any supplemental replies subsequent to the first communication responding to this requirement and any information disclosures beyond the scope of this requirement under 37 CFR 1.105 are subject to the fee and certification requirements of 37 CFR 1.97.

The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. If an item required by the examiner is unknown to the applicant, a statement that the item is unknown to applicant will be accepted as a complete response to the requirement for that item. Where the applicant does not have and cannot readily obtain an item of required information, a statement that the item cannot be readily obtained will be accepted as a complete response to the requirement for that item.

This requirement is subject to the provisions of 37 CFR 1.134, 1.135 and 1.136 and has a shortened statutory period of 3 months. EXTENSIONS OF THIS TIME PERIOD MAY BE GRANTED UNDER 37 CFR 1.136(a).



Notice of References Cited

Application/Control No.

10/613,317

Applicant(s)/Patent Under

Reexamination

CHANDLER, CRAIG K.

Examiner

Kent L. Bell

Art Unit

1661

Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	Classification
	A	US-			
	B	US-			
	C	US-			
	D	US-			
	E	US-			
	F	US-			
	G	US-			
	H	US-			
	I	US-			
	J	US-			
	K	US-			
	L	US-			
	M	US-			

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	<i>RANDON ET AL.; STRAWBERRY CULTIVARS GROWN UNDER PROTECTED STRUCTURE AND THEIR SUSCEPTIBILITY TO NATURAL INFESTATION OF THE COTTON APHID, ADHIS GOSSYPII GLOVER.; HORTSCIENCE 38(5): P.806, AUGUST 2003. (ABSTRACT)</i>
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.



2/9,K/4 (Item 4 from file: 5)
 DIALOG(R) File 5: Biosis Previews(R)
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0014879806 BIOSIS NO.: 200400250563

Strawberry cultivars grown under protected structure and their susceptibility to natural infestation of the cotton aphid, *Aphis gossypii* Glover.

AUTHOR: Rondon Silvia (Reprint); Paranjpe Ashwin (Reprint); Cantliffe Daniel (Reprint)

AUTHOR ADDRESS: Horticultural Sciences, University of Florida, PO Box 110690, Gainesville, FL, 32611, USA**USA

JOURNAL: Hortscience 38 (5): p806 August 2003 2003

MEDIUM: print

CONFERENCE/MEETING: American Association for Horticultural Science Centennial Conference Providence, RI, USA October 03-06, 2003; 20031003

SPONSOR: American Association for Horticultural Science

ISSN: 0018-5345 (ISSN print)

DOCUMENT TYPE: Meeting; Meeting Abstract

RECORD TYPE: Abstract

LANGUAGE: English

ABSTRACT: The cotton aphid, *Aphis gossypii* Glover (Homoptera: Aphididae), is one of the most important greenhouse pests worldwide. This soft-bodied insect secretes honeydew, which results in a sooty mold that blocks the photosynthetic leaf area reducing the growth capability of the plant, and potentially causing yield reduction. In order to determine the susceptibility of the ***strawberry*** (*FragariaXananassa* Duch.) to natural infestation of the cotton aphid in a passive ventilated greenhouse, seven ***strawberry*** cultivars were grown and evaluated. The cultivars **Carmin**e, Festival, Camarosa, Treasure, Sweet Charlie, Earlibrite and FL 97-39 were planted at a density of 22 plants per m². No insecticide was used. Ten ***strawberry*** leaflets were selected at random, and the total number of aphids per leaflet was counted weekly. Five releases of *Aphidius colemani* L. and one of *Lysiphlebus testaceipes* L. at an approximately rate of 200 wasps per 18 m row were made. 'Sweet Charlie' and '**Carmin**e' sustained the greatest average number of aphids per leaflet throughout all the growing season; while 'FL97-39' and 'Camarosa' had the lowest number of aphids per leaflet. The population dynamics of the aphid continued to rise in all cultivars from late November to mid- January; however, 95% aphid control was achieved by the end of February. The yield for 'FL 97-39' was the greatest, which correlated with the lowest number of aphids per leaflet throughout the season; however that cultivar had the greatest susceptibility to powdery mildew.

DESCRIPTORS:

MAJOR CONCEPTS: Economic Entomology; Horticulture--Agriculture; Infection ; Pest Assessment Control and Management

BIOSYSTEMATIC NAMES: Homoptera--Insecta, Arthropoda, Invertebrata, Animalia; Hymenoptera--Insecta, Arthropoda, Invertebrata, Animalia; Rosaceae--Dicotyledones, Angiospermae, Spermatophyta, Plantae

ORGANISMS: *Aphis gossypii* {cotton aphid} (Homoptera)--pest; *Aphidius colemani* (Hymenoptera)--biocontrol agent; *Lysiphlebus testaceipes* (Hymenoptera)--biocontrol agent; **Fr**agaria x ananassa {**strawberry**} (Rosaceae)--host, small fruit crop, cultivar-Camarosa, cultivar-**Carmin**e, cultivar-Earlibrite, cultivar-FL 97-39, cultivar-Festival, cultivar-Sweet Charlie, cultivar-Treasure

ORGANISMS: PARTS ETC: honeydew--secretion

COMMON TAXONOMIC TERMS: Animals; Arthropods; Insects; Invertebrates; Angiosperms; Dicots; Plants; Spermatophytes; Vascular Plants

DISEASES: powdery mildew--fungal disease; sooty mold--fungal disease

MISCELLANEOUS TERMS: cultivar variation; greenhouse; natural infestation susceptibility; protected structure; Meeting Abstract

CONCEPT CODES:

00520 General biology - Symposia, transactions and proceedings
36008 Medical and clinical microbiology - Mycology
53006 Horticulture - Small fruits
53012 Horticulture - Miscellaneous and mixed crops
54502 Phytopathology - Diseases caused by fungi
54600 Pest control: general, pesticides and herbicides
60002 Economic entomology - General
60006 Economic entomology - Fruits and nuts
60014 Economic entomology - Biological control
64076 Invertebrata: comparative, experimental morphology, physiology and pathology - Insecta: physiology

BIOSYSTEMATIC CODES:

75324 Homoptera
75326 Hymenoptera
26675 Rosaceae

Strawberry cultivars grown under protected structure and their susceptibility to natural infestation of the cotton aphid...

...ABSTRACT: the plant, and potentially causing yield reduction. In order to determine the susceptibility of the **strawberry** (*FragariaXananassa* Duch.) to natural infestation of the cotton aphid in a passive ventilated greenhouse, seven **strawberry** cultivars were grown and evaluated. The cultivars *****Carmin*****, Festival, Camarosa, Treasure, Sweet Charlie, Earlibrite and FL 97-39 were planted at a density of 22 plants per m². No insecticide was used. Ten **strawberry** leaflets were selected at random, and the total number of aphids per leaflet was counted...

...an approximately rate of 200 wasps per 18 m row were made. 'Sweet Charlie' and '**Carmin*****' sustained the greatest average number of aphids per leaflet throughout all the growing season; while...

DESCRIPTORS:

...ORGANISMS: *****Fragaria***** x *ananassa* { *****strawberry***** } (Rosaceae...

...host, small fruit crop, cultivar-Camarosa, cultivar- *****Carmin*****, cultivar-Earlibrite, cultivar-FL 97-39, cultivar-Festival, cultivar-Sweet Charlie, cultivar-Treasure



Strawberry plant named 'Carmine'

Botanical designation: *Fragaria* × *ananassa* Duchesne

Cultivar designation: 'Carmine'

Background of the invention. All phases of the development of the new variety took place at Dover, Florida as part of an ongoing breeding program. 'Carmine' resulted from a controlled cross between 'Rosa Linda' (U.S. plant patent no. 9,866) and FL 93-53 (not patented). Seeds from the cross were germinated in a greenhouse, and the resulting seedlings were planted and allowed to produce daughter plants by asexual propagation (i.e. by runners). Two daughter plants from each seedling were transplanted to raised beds, where they fruited during the 1995-96 season. 'Carmine' (as represented by two daughter plants from the original seedling) exhibited attractive, firm fruit, and therefore was selected for further evaluation. 'Carmine' has been asexually propagated by runners, annually, and further test plantings have established that the vegetative and fruit characteristics of the propagules are identical to the initial two daughter plants.

Summary of the Invention. The invention is a new and distinct variety of strawberry named 'Carmine'. When 'Carmine' is grown in a subtropical fall and winter climate, it is set apart from all other strawberry varieties known to the inventor by a combination of the following characteristics: high December through February production (greater than 17,000 pounds of marketable fruit per acre); fruit that are firm, deep red, and glossy; and moderate resistance to

Botrytis and anthracnose fruit rot diseases.

Brief description of the drawing.

Fig. 1 shows a typical plant of ‘Carmine’ during late February at Dover, Florida.

Fig. 2 shows typical fruit of ‘Carmine’ harvested at Dover, Florida during the peak of the season.

Detailed Botanical Description. The following botanical description is that of mature plants of ‘Carmine’ grown under the ecological conditions (warm days, cool nights) prevailing at Dover, Florida in late February. Colors are described using the Pantone® Color Formula Guide.

Contrast is made to ‘Sweet Charlie’ (U.S. plant patent no. 8,729) and ‘Camarosa’ (U.S. plant patent no. 8,708), standard varieties, for reliable description. ‘Carmine’ is a promising candidate for commercial success in that it has high early season fruit production like ‘Sweet Charlie’, but has significantly firmer fruit than ‘Sweet Charlie’. ‘Carmine’ is a short day cultivar. It has a more compact plant habit than ‘Camarosa’ and ‘Rosa Linda’. Average height and width for mature plants is 19 cm and 26 cm respectively. Average petiole length and diameter is 15.6 cm and 2.5 mm respectively, and petioles have a medium pubescence. Terminal leaflets are essentially round, with an average length and breadth of 60 and 59 mm respectively, while secondary leaflets are very slightly ovoid, with an average length and breadth of 56 and 52 mm respectively. Leaflet apices and bases are obtuse. Leaflet margins are crenate and average 18 serrations per terminal leaflet, and 18 per secondary leaflet. The upper leaf surface is a dark grey green (Pantone® 370 U); the lower leaf surface is a light grey green (Pantone® 377 U); and the petiole is a medium yellow green (Pantone® 397 U). Flowers open at or above the canopy, and

have an average of 5 petals and 24 stamens. Petals are round, with an average length and width of 9 mm. They have an entire margin and an obtuse apex and base. The average diameter of the corolla is 28 mm. The color of the calyx is yellow green (Pantone® 363 U). Pedicels attached to mature primary fruit are 11 to 22 cm long, 2.0 mm in diameter, yellow green (Pantone® 384), with branching of the inflorescence usually occurring very close to the crown. Mean fruit weight is less than or similar to that of 'Sweet Charlie' (Table 1 and 2) and 'Rosa Linda'. Primary fruit are medium conic or wedge shaped (weighing 25-35 g); whereas secondary and tertiary fruit are mostly short conic (weighing 10-25 g). The external color of fully mature fruit is deep red (Pantone® 1807C) and glossy; internal color is a warm red (Pantone® 1795C). The achenes are generally greenish yellow and level with or slightly protruding from the fruit surface. The calyx is generally medium in size, attractive, and composed of 12 mostly elliptic sepals, which are about 10 mm in length and 4-6 mm in width. Some of the sepals have two or more incisions at their apex. Fruit of 'Carmine' are firmer than those of 'Sweet Charlie' (Table 3) and 'Rosa Linda'. The flavor of this fruit is acceptable, but not as highly regarded as that of 'Camarosa', 'Sweet Charlie', and 'Strawberry Festival' (U.S. plant patent no. 14,739) (Table 4). While generally sweet and juicy, the fruit, at times, can be slightly astringent. The preferred planting date for 'Carmine' is October 10 to October 17. Early season yields of 'Carmine' compared favorably to 'Sweet Charlie' and 'Earlibrite' (U.S. plant patent no. 13,061) during both the 1997-98 and 2001-02 seasons (Table 1 and 2). The December yield of 'Carmine' in 2001 was over twice that of 'Sweet Charlie'. Yield during December can be important to a Florida grower's profitability. The average price per flat (10.25 lbs) during the five seasons between 1995 and 2000 was \$17.38, \$11.57, \$10.51, and \$7.27 for December, January, February, and March

respectively (Florida Agricultural Statistics Service). 'Carmine' is moderately resistant to the two most serious disease problems on strawberry in Florida: Botrytis fruit rot (caused by *Botrytis cinerea* Pers.exFr.) and anthracnose fruit rot (caused by *Colletotrichum acutatum* Simmonds). In an unsprayed trial during the 2001-02 and 2002-03 seasons, 7.3 and 2.2% of the 'Carmine' fruit harvested from 19 Feb. to 15 Mar. showed symptoms of Botrytis fruit rot, compared to 18.7 and 6.8% for 'Sweet Charlie', the susceptible control. In another unsprayed trial during the 2001-02 and 2002-03 seasons, 9.6 and 9.3% of the 'Carmine' fruit harvested from 19 Feb. to 22 Mar. showed symptoms of anthracnose fruit rot, compared to 28.9 and 47.0% for 'Strawberry Festival', the susceptible control. The susceptibility of 'Carmine' to the twospotted spider mite (*Tetranychus urticae* Koch) is unknown, but a serious infestation has not yet been observed in research center or commercial trials. DNA banding patterns for 'Carmine', 'Sweet Charlie', 'Camarosa', 'Earlibrite', 'Oso Grande' (U.S. plant patent no. 6,578) and 'Strawberry Festival' are presented in Table 5.

Table 1. Performance of strawberry cultivars at Dover, Fla. during the 1997-98 season^z.

Cultivar	Marketable yield (g/plant)					Wt/ fruit ^y (g)
	December	January	February	March	Total	
Carmine	114 a ^x	85 a	246 ab	212 b	657 b	16.4 c
Camarosa	50 b	105 a	167 c	426 a	748 ab	20.0 a
S. Charlie	91 a	54 b	219 abc	257 b	622 b	17.6 b
Earlibrite	66 b	110 a	189 bc	280 b	645 b	20.7 a
S. Festival	58 b	108 a	255 a	426 a	847 a	17.6 a

^zTransplants were obtained from the following nursery locations: 'Camarosa' from a commercial nursery in North Carolina; all other entries were from GCREC-Dover. 'Camarosa' was planted on 16 Oct.; all other cultivars were planted on 9 Oct.

^yMean fruit weight was determined by dividing total marketable fruit yield per plot by total marketable fruit number per plot.

^xWithin columns, means followed by one or more of the same letters are not statistically different from each other at $P \leq 0.05$.

Table 2. Performance of strawberry cultivars at Dover, Fla. during the 2001-02 season^z.

Cultivar	Marketable yield (g/plant)				Wt/ fruit ^y (g)
	December	January	February	Total	
Carmine	232 a ^x	62 b	204 a	499 a	17.0 b
S. Charlie	102 c	92 a	166 a	360 b	16.4 b
Earlibrite	205 ab	33 c	201 a	439 a	21.1 a
S. Festival	163 b	61 b	221 a	444 a	17.2 b

^zAll transplants were obtained from a commercial nursery in North Carolina, and planted on 9 Oct.

^yMean fruit weight was determined by dividing total marketable fruit yield per plot by total marketable fruit number per plot.

^xWithin columns, means followed by one or more of the same letters are not statistically different from each other at $P \leq 0.05$.

Table 3. Physical and chemical characteristics of strawberry fruit harvested at Dover, Fla. 23 Feb. 1998 and 25 Feb. 2002.

	L value ^z		Firmness (kg force)		Soluble solids (%)		Titratable acidity (% citric acid)	
	1998	2002	1998	2002	1998	2002	1998	2002
Cultivar								
Carmine	30.5 c ^y	35.7 b	0.38 a	0.41 a	8.6	6.5	0.77	0.86
Camarosa	29.6 c	34.2 b	0.43 a	0.27 b	7.7	8.5	0.87	0.93
Sweet Charlie	35.1 a	38.2 a	0.22 b	0.30 b	8.0	7.3	0.65	0.75
S. Festival	32.6 b	35.6 b	0.38 a	0.42 a	7.7	8.0	0.77	0.84

^z The lower the value, the darker the color.^y Within columns, means followed by one or more of the same letters are not statistically different from each other at $P \leq 0.05$.

Table 4. Sensory characteristics of strawberry fruit harvested at Dover, Fla. 25 Feb. 2002^z.

Cultivar	Appearance	Firmness	Flavor	Sweetness
Carmine	7.2 a ^y	7.1 b	5.3 c	4.8 c
Camarosa	6.7 b	7.0 bc	6.8 a	6.6 a
Sweet Charlie	6.2 b	6.6 c	6.2 b	6.0 b
S. Festival	7.5 a	7.5 a	7.2 a	6.8 a

^zMeans based on the ratings of 72 untrained panelists. Characteristics are rated on a 1-9 hedonic scale, with 1 = dislike extremely, 5 = neither like nor dislike, and 9 = like extremely.

^yWithin columns, means followed by one or more of the same letters are not statistically different from each other at $P \leq 0.05$.

Table 5. DNA marker analysis^z

Variety	Primer				
	B06	B07	B14	X11	X06
	Band number for each primer and DNA pattern				
	123	1234	12345	1	12
Carmine	000	1101	00000	0	10
Earlibrite	101	1101	00000	0	11
Sweet Charlie	011	0101	00111	1	01
Camarosa	101	1010	00010	1	11
Oso Grande	001	1011	11010	1	10
S. Festival	000	1001	00010	1	10

^zRandom amplified polymorphic DNA (RAPD) patterns were determined using primers B06, B07, B14, X06, and X11 from Operon Technologies, Inc.. Stolon tip DNA's were isolated using DNeasy Plant™ extraction kit from Qiagen®, Inc. Amplification reactions were performed in 20 microliter volumes using a procedure adapted from Williams et al., 1990, Nucleic Acids Research 25: 6531-6535. The reagents and conditions included 50 mM Tris (pH 8.3), 0.25 mg/mL bovine serum albumin, 2.1 mM MgCl₂, 0.5 % Ficoll 400, 1.0 mM tartrazine, 0.2 mM each of dATP, dCTP, dGTP, dTTP, 1.0 mM primer DNA, 0.065 ng strawberry DNA, 1 unit Taq-DNA polymerase (Promega, Inc.). The reaction conditions were 4 minutes at 94 °C, then 10 seconds at 94 °C, 1 minute at 45 °C, 3.5 minutes at 68 °C, then 9 cycles of 10 seconds at 94 °C, 1 minute at 45 °C with an incrementation of 0.5 degrees per cycle, 3.5 minutes at 68 °C, then 29 cycles of 10 seconds at 94 °C, 1 minute at 40 °C and 3.5 minutes at 68 °C with a 10 second extension per cycle. The reactions were incubated in Model PTC-100 thermocycler (MJR, Inc.). The reaction products were analyzed with gel electrophoresis using 1.0 % agarose 3:1 high resolution blend (AMRESCO, Inc.) in a running buffer of 0.045 M Tris-Borate, 0.001 M EDTA. The separated DNA was detected using ethidium bromide and viewed with a ultra violet transilluminator. Reproducible polymorphic banding from the electrophoresis analysis was observed with the DNA primers. The amplification reactions resulted with varying levels of polymorphism, from 2 to 5 polymorphic bands depending on the primer used. The polymorphic bands were scored as 0 equals absence and 1 equals presence.

Claims:

A new and distinct variety of strawberry plant, substantially as shown and described.

Abstract. This invention is a new and distinct variety of strawberry named 'Carmine'. 'Carmine' is characterized by high December through February production of fruit that are firm, deep red, glossy, and moderately resistant to Botrytis and anthracnose fruit rot diseases when grown in west central Florida.



Strawberry plant named 'Carmine' Strawberry Plant

Botanical designation: *Fragaria X-ananassa* Duchesne

Cultivar designation: 'Carmine'

Background of the New Variety. All phases of the development of the new variety took place at Dover, Florida as part of an ongoing breeding program. ~~The present invention relates to a new and distinct variety of strawberry (*Fragaria X-ananassa* Duchesne) plant which is named 'Carmine' resulted from a controlled cross between 'Rosa Linda' (U.S. plant patent no. 9,866) and FL 93-53 (not patented) more particularly to a strawberry plant that is distinguished by its high early season (December through February) production of firm, deep red fruit. Seeds from the cross were germinated in a greenhouse, and the resulting seedlings were planted and allowed to produce daughter plants by asexual propagation (i.e. by runners). Two daughter plants from each seedling were transplanted to raised beds, where they fruited during the 1995-96 season. 'Carmine' (as represented by two daughter plants from the original seedling) exhibited attractive, firm fruit, and therefore was selected for further evaluation. 'Carmine' has been asexually propagated by runners, annually, and further test plantings have established that the vegetative and fruit characteristics of the propagules are identical to the initial two daughter plants. Asexual propagation was performed at Dover, Florida where the selection was made and plants were tested. Contrast is made to 'Sweet Charlie' (U.S. plant patent no. 8,729) and 'Camarosa' (U.S. plant patent no. 8,708), standard varieties, for reliable description. This new variety is a promising candidate for commercial success in that it has high early season fruit production like 'Sweet Charlie', but has significantly firmer fruit than 'Sweet Charlie'.~~

Origin of the Variety. This strawberry plant (genotype) originated in a strawberry breeding plot at Dover, Florida. The seed parent was 'Rosa Linda' (U.S. plant patent no. 9,866), a strawberry variety with a desirable fruit shape and high early season yield potential. The pollen parent was FL 93-53 (not patented), a University of Florida breeding selection with the ability to produce firm attractive fruit. The seeds resulting from the controlled hybridization were germinated in a greenhouse and the resulting seedlings were planted and allowed to produce daughter plants by asexual propagation (i.e. by runners). Two daughter plants from each seedling were transplanted to raised beds, where they fruited. 'Carmine' strawberry (as represented by two daughter plants from the original seedling) exhibited attractive, firm fruit, and therefore was selected for further evaluation. 'Carmine' was selected from among 139 sibling genotypes as the 256th selection of the 1995-96 season, and thus was designated FL 95-256. It has been asexually propagated by runners, annually, and further test plantings have established that the vegetative and fruit characteristics of the propagules are identical to the initial two daughter plants.

Summary of the Variety Invention. The invention is a new and distinct variety of strawberry named 'Carmine'. When 'Carmine', when is grown in a subtropical fall and winter climate, it is set apart from all other strawberry plants known to the inventor by a combination of the following characteristics: high December through February production (greater than 17,000 pounds of marketable fruit per acre); fruit that are firm, deep red, and glossy; and moderate resistance to Botrytis and anthracnose fruit rot diseases.

Brief description of the drawing. The accompanying photographs show a typical specimen of the

plant and fruit as seen during the peak production of 'Carmine' in late February.

Fig. 1 shows a typical plant of 'Carmine' during late February at Dover, Florida.

Fig. 2 shows typical fruit of 'Carmine' harvested at Dover, Florida during the peak of the season.

Detailed Botanical Description. The following botanical description is that of mature plants of the variety 'Carmine' grown under the ecological conditions (warm days, cool nights) prevailing at Dover, Florida in late February. Colors are described using the Pantone® Color Formula Guide (www.pantone.com).

Contrast is made to 'Sweet Charlie' (U.S. plant patent no. 8,729) and 'Camarosa' (U.S. plant patent no. 8,708), standard varieties, for reliable description. 'Carmine' is a promising candidate for commercial success in that it has high early season fruit production like 'Sweet Charlie', but has significantly firmer fruit than 'Sweet Charlie'. 'Carmine' is a short day cultivar. It has a more compact plant habit than 'Camarosa' and 'Rosa Linda'. Average height and width for mature plants is 19 cm and 26 cm respectively. Average petiole length and diameter is 15.6 cm and 2.5 mm respectively, and petioles have a medium pubescence. Terminal leaflets are essentially round, with an average length and breadth of terminal leaflets is 60 and 59 mm respectively, while secondary leaflets are very slightly ovoid, with an average length and breadth of secondary leaflets is 56 and 52 mm respectively. Leaflet apices and bases are obtuse. Leaflet margins are crenate and average 18 serrations per terminal leaflet, and 18 per secondary leaflet. The upper leaf surface is a dark grey green (Pantone® 370 U); the lower leaf surface is a light grey green (Pantone® 377 U); and the petiole is a medium yellow green (Pantone® 397 U).

Flowers open at or above the canopy, and have an average of 5 petals and 24 stamens. Individual petals are round, with an average length and width of 9 mm. They have an entire margin and an obtuse apex and base. The average diameter of the corolla (i.e. the petals collectively) is 28 mm. The color of the calyx is yellow green (Pantone® 363 U). Pedicels attached to mature primary fruit are 11 to 22 cm long, 2.0 mm in diameter, yellow green (Pantone® 384), with branching of the inflorescence usually occurring very close to the crown. Mean fruit weight is less than or similar to that of 'Sweet Charlie' (Table 1 and 2) and 'Rosa Linda'. Primary fruit are medium conic or wedge shaped (weighing 25-35 g); whereas secondary and tertiary fruit are mostly short conic (weighing 10-25 g). The external color of fully mature fruit is deep red (Pantone® 1807C) and glossy; internal color is a warm red (Pantone® 1795C). The achenes are generally greenish yellow and level with or slightly protruding from the fruit surface. The calyx is generally medium in size, and attractive, and composed of 12 mostly elliptic sepals, which are about 10 mm in length and 4-6 mm in width. Some of the sepals have two or more incisions at their apex. Fruit of 'Carmine' are firmer than those of 'Sweet Charlie' (Table 3) and 'Rosa Linda'. The flavor of this fruit is acceptable, but not as highly regarded as that of 'Camarosa', 'Sweet Charlie', and 'Strawberry Festival' (U.S. plant patent no. 14,739) (Table 4). While generally sweet and juicy, the fruit, at times, can be slightly astringent. The preferred planting date for 'Carmine' is October 10 to October 15. Early season yields of 'Carmine' compared favorably to 'Sweet Charlie' and 'Earlibrite' (U.S. plant patent no. 13,061) during both the 1997-98 and 2001-02 seasons (Table 1 and 2). The December yield of 'Carmine' in 2001 was over twice that of 'Sweet Charlie'. Yield during December can be important to a Florida grower's profitability. The average price per flat (10.25 lbs) during the five seasons between 1995 and

2000 was \$17.38, \$11.57, \$10.51, and \$7.27 for December, January, February, and March respectively (Florida Agricultural Statistics Service, www.nass.usda.gov/fl). 'Carmine' is moderately resistant to the two most serious disease problems on strawberry in Florida: Botrytis fruit rot (caused by *Botrytis cinerea* Pers.exFr.) and anthracnose fruit rot (caused by *Colletotrichum acutatum* Simmonds). In an unsprayed trial during the 2001-02 and 2002-03 seasons, 7.3 and 2.2% of the 'Carmine' fruit harvested from 19 Feb. to 15 Mar. showed symptoms of Botrytis fruit rot, compared to 18.7 and 6.8% for 'Sweet Charlie', the susceptible control. In another unsprayed trial during the 2001-02 and 2002-03 seasons, 9.6 and 9.3% of the 'Carmine' fruit harvested from 19 Feb. to 22 Mar. showed symptoms of anthracnose fruit rot, compared to 28.9 and 47.0% for 'Strawberry Festival', the susceptible control. The susceptibility of 'Carmine' to the twospotted spider mite (*Tetranychus urticae* Koch) is unknown, but a serious infestation has not yet been observed in research center or commercial trials. DNA banding patterns for 'Carmine', 'Sweet Charlie', 'Camarosa', 'Earlibrite', 'Oso Grande' (U.S. plant patent no. 6,578) and 'Strawberry Festival' are presented in Table 5.

Table 1. Performance of strawberry cultivars at Dover, Fla. during the 1997-98 season^z.

Cultivar	Marketable yield (g/plant)					Wt/ fruit ^y (g)
	December	January	February	March	Total	
Carmine	114 a ^x	85 a	246 ab	212 b	657 b	16.4 c
Camarosa	50 b	105 a	167 c	426 a	748 ab	20.0 a
S. Charlie	91 a	54 b	219 abc	257 b	622 b	17.6 b
Earlibrite	66 b	110 a	189 bc	280 b	645 b	20.7 a
S. Festival	58 b	108 a	255 a	426 a	847 a	17.6 a

^zTransplants were obtained from the following nursery locations: 'Camarosa' from a commercial nursery in North Carolina; all other entries were from GCREC-Dover. 'Camarosa' was planted on 16 Oct.; all other cultivars were planted on 9 Oct.

^yMean fruit weight was determined by dividing total marketable fruit yield per plot by total marketable fruit number per plot.

^xWithin columns, Means followed by one or more of the same letters are not statistically different from each other at based on four replications. Mean separation within columns by Fisher's protected LSD test, $P \leq 0.05$.

Table 2. Performance of strawberry cultivars at Dover, Fla. during the 2001-02 season^z.

Cultivar	Marketable yield (g/plant)				Wt/ fruit ^y (g)
	December	January	February	Total	
Carmine	232 a ^x	62 b	204 a	499 a	17.0 b
S. Charlie	102 c	92 a	166 a	360 b	16.4 b
Earlibrite	205 ab	33 c	201 a	439 a	21.1 a
S. Festival	163 b	61 b	221 a	444 a	17.2 b

^zAll transplants were obtained from a commercial nursery in North Carolina, and planted on 9 Oct.

^yMean fruit weight was determined by dividing total marketable fruit yield per plot by total marketable fruit number per plot.

^x Within columns, means followed by one or more of the same letters are not statistically different from each other at Means based on four replications. Mean separation within columns by Fisher's protected LSD test, $P \leq 0.05$.

Table 3. Physical and chemical characteristics of strawberry fruit harvested at Dover, Fla. 23 Feb. 1998 and 25 Feb. 2002.^z

Cultivar	L value ^{y,z}		Firmness (kg force)		Soluble solids (%)		Titratable acidity (% citric acid)	
	1998	2002	1998	2002	1998	2002	1998	2002
Carmine	30.5 c ^y	35.7 b	0.38 a	0.41 a	8.6	6.5	0.77	0.86
Camarosa	29.6 c	34.2 b	0.43 a	0.27 b	7.7	8.5	0.87	0.93
Sweet Charlie	35.1 a	38.2 a	0.22 b	0.30 b	8.0	7.3	0.65	0.75
S. Festival	32.6 b	35.6 b	0.38 a	0.42 a	7.7	8.0	0.77	-0.84

^z The lower the value, the darker the color.^y L and firmness values are the average of eight observations. Mean separation within columns by Duncan's multiple range test.Within columns, means followed by one or more of the same letters are not statistically different from each other at $P \leq 0.05$.^y The lower the value, the darker the color.

Table 4. Sensory characteristics of strawberry fruit harvested at Dover, Fla. 25 Feb. 2002^z.

Cultivar	Appearance	Firmness	Flavor	Sweetness
Carmine	7.2 a ^y	7.1 b	5.3 c	4.8 c
Camarosa	6.7 b	7.0 bc	6.8 a	6.6 a
Sweet Charlie	6.2 b	6.6 c	6.2 b	6.0 b
S. Festival	7.5 a	7.5 a	7.2 a	6.8 a

^zMeans based on the ratings of 72 untrained panelists. ~~Mean separation within columns by Duncan's multiple range test, $P \leq 0.05$.~~ Characteristics are rated on a 1-9 hedonic scale, with 1 = dislike extremely, 5 = neither like nor dislike, and 9 = like extremely.

^y Within columns, means followed by one or more of the same letters are not statistically different from each other at $P < 0.05$.

Table 5. DNA marker analysis^z

Variety	Primer				
	B06	B07	B14	X11	X06
	Band number for each primer and DNA pattern				
	123	1234	12345	1	12
Carmine	000	1101	00000	0	10
Earlibrite	101	1101	00000	0	11
Sweet Charlie	011	0101	00111	1	01
Camarosa	101	1010	00010	1	11
Oso Grande	001	1011	11010	1	10
S. Festival	000	1001	00010	1	10

^zRandom amplified polymorphic DNA (RAPD) patterns were determined using primers B06, B07, B14, X06, and X11 from Operon Technologies, Inc.. Stolon tip DNA's were isolated using DNeasy Plant™ extraction kit from Qiagen®, Inc. Amplification reactions were performed in 20 microliter volumes using a procedure adapted from Williams et al., 1990, Nucleic Acids Research 25: 6531-6535. The reagents and conditions included 50 mM Tris (pH 8.3), 0.25 mg/mL bovine serum albumin, 2.1 mM MgCl₂, 0.5 % Ficoll 400, 1.0 mM tartrazine, 0.2 mM each of dATP, dCTP, dGTP, dTTP, 1.0 mM primer DNA, 0.065 ng strawberry DNA, 1 unit Taq-DNA polymerase (Promega, Inc.). The reaction conditions were 4 minutes at 94 °C, then 10 seconds at 94 °C, 1 minute at 45 °C, 3.5 minutes at 68 °C, then 9 cycles of 10 seconds at 94 °C, 1 minute at 45 °C with an incrementation of 0.5 degrees per cycle, 3.5 minutes at 68 °C, then 29 cycles of 10 seconds at 94 °C, 1 minute at 40 °C and 3.5 minutes at 68 °C with a 10 second extension per cycle. The reactions were incubated in Model PTC-100 thermocycler (MJR, Inc.). The reaction products were analyzed with gel electrophoresis using 1.0 % agarose 3:1 high resolution blend (AMRESCO, Inc.) in a running buffer of 0.045 M Tris-Borate, 0.001 M EDTA. The separated DNA was detected using ethidium bromide and viewed with a ultra violet transilluminator. Reproducible polymorphic banding from the electrophoresis analysis was observed with the DNA primers. The amplification reactions resulted with varying levels of

polymorphism, from 2 to 5 polymorphic bands depending on the primer used. The polymorphic bands were scored as 0 equals absence and 1 equals presence.

We eClaims:

A new and distinct variety of strawberry plant, substantially as shown and described as illustrated and described, characterized by high December through February production of fruit that are firm, deep red, glossy and moderately resistant to Botrytis and anthracnose fruit rot diseases when grown in the Dover/Plant City area of Florida.

Abstract. This invention is a A new and distinct variety of strawberry (~~*Fragaria X*~~
~~*ananassa*~~), named 'Carmine' which originated from seed produced by a hand-pollinated cross
between 'Rosa Linda' and FL 93-53. The new strawberry, named 'Carmine', is
distinguished characterized by high December through February production of fruit that are firm,
deep red, glossy and moderately resistant to Botrytis and anthracnose fruit rot diseases when
grown in ~~Dover, Florida or other areas that have a subtropical climate similar to that of~~
~~Dover,~~ west central Florida.